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SPELLING AND ARITHMETIC IN 1846 AND TODAY

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Because of a very opportune find by Principal Riley, of Springfield, Mass., the most satisfactory comparison of the school methods of our grandfathers' time and of our own was recently made possible. While rummaging in the garret of an old school building, complete sets of examination papers, together with the answers and markings, all bearing the date of October, 1846, were found, and are today in a bound volume in the office of the superintendent.

By submitting these questions to pupils of the same age, and comparing results, the school authorities in Springfield were enabled to arrive at some rational comparison as to the progress or retrogression of the school system in Springfield at least.

Originally the questions were given to pupils of the ninth grade, which would correspond to the freshmen class of our own high school. In order to make the test absolutely fair, they should have been submitted to the high school rather than to the eighth grade.

The writer often has been called upon to dispose of the charge that in general our grandfathers as children were better spellers and better arithmeticians than the children of our own generation. At their best, heretofore the champions of the old and the new have not been able to find any fixed basis for sound argument, but have proceeded from their own conclusions, which are often colored by personal prejudice.

On December 20 the questions were taken verbatim from the list of 1846 and submitted to the pupils of our eighth grade, both eighth B's and eighth A's. The time consumed in the arithmetic examination was approximately forty minutes, and in spelling about twenty minutes. The questions were given without any preparation whatever on the part of the children, without any previous notice to teacher or pupil, and without any intimation as to why the exam-

ination was called, or any information as to the source of the questions. The following were the questions in arithmetic:

1. Add together the following numbers: Three thousand and nine, twenty-nine, one, three hundred and one, sixty-one, sixteen, seven hundred two, nine thousand, nineteen and a half, one and a half.
2. Multiply 10008 by 8009.
3. In a town five miles wide and six miles long, how many acres?
4. How many steps of two and half feet each will a person take in walking one mile?
5. What is one third of $175\frac{1}{2}$?
6. A boy bought three dozen of oranges for $37\frac{1}{2}$ cents, and sold them for $1\frac{1}{2}$ cents apiece; what would he have gained if he had sold them for $2\frac{1}{2}$ cents apiece?
7. There is a certain number, one third of which exceeds one fourth of it by two; what is the number?
8. What is the simple interest of \$1200 for 12 years, 11 months, and 29 days at 6%?

In 1846 the average percentage of correct answers was 29.4. In Springfield in 1905 the average percentage of correct answers in this same examination was 65.5, and in Goshen the average of correct answers reached the remarkably high grade of 87.8 per cent.

Following is the list of words to be spelled:

accidental	deceitfully	feignedly	imbecility
accessible	descendant	ghastliness	inconceivable
baptism	eccentric	gnawed	inconvenience
chirography	evanescent	heiress	inefficient
characteristic	fierceness	hysterics	irresistible

It will be noticed that their array is rather imposing and would be formidable even to the reader.

The average percentage of correct answers in both subjects was: 1846, Springfield, arithmetic, 29.4; spelling, 40.6; 1905, Springfield, arithmetic, 65.5; spelling, 51.2; 1905, Goshen, arithmetic, 87.8; spelling, 46.2.

On careful examination of the existing conditions at the time of these tests, the results lead us to several conclusions.

In 1846 the Springfield school year consisted of 44 weeks of actual school work, each school day containing 6 hours. In 1905 in Springfield the year consisted of 40 weeks of 5 hours each day. In other words, in 1846 the schools were in session about 1,340 hours; in 1905

the schools were in session about 1,000 hours. In 1846 the schools were among the best, as they had been the first to have a regularly appointed superintendent; they were entirely without any foreign, non-English-speaking, element, had been highly complimented by Horace Mann, and were under excellent supervision. Their course of study was quite definite, and consisted daily of reading, writing, arithmetic, geography, and spelling. Spelling especially was strongly emphasized, as the following extracts from the course of study at that time show:

Accuracy in spelling and excellence in reading are deemed of the first importance.

Ability to spell correctly is deemed highly important, as lying at the foundation of all requirements, without which no person can be accurate or intelligible as a scholar, or ever safe from exposure to great mortification in after-life.

At the present time in Goshen the school year consists of 36 weeks of 5 hours per day, making the year contain 900 hours. In both cities the children are supposed to enter the grades at 6 years and high school at 14 years of age. In reality the children who took the examination in 1846 had been in school correspondingly 3 years longer than their Springfield grandchildren in 1905, and over 4 years longer than the Goshen children who last month wrote this examination. Nevertheless the pupils of 1905 reached a much higher percentage of effectiveness than their grandfathers of 1846. This is shown, not only in the total of correct answers, but in reduced differences. For example, in 1846:

More than one-fourth of the examples were passed over as too difficult to attack, and the incorrect answers were so far from the mark as to overwhelm one with the conviction that the children were entirely lacking in power to mentally approximate the results. Answers to the fifth example varied from $5\frac{1}{2}$ to 6,312. Below are some of the incorrect answers to the problem in simple interest—a problem which was worked correctly by only thirteen pupils. Dollar signs, decimal points, and commas are the pupils', the first two conspicuous chiefly by their absence:

\$87.58.00; \$93.58; \$114.00; \$179.80; 907.92; \$937.80; \$9328.00; 93.28; 96.86; 115.08; 2.15.80; 449.50000; 475.00; 638.00; 932.200; 1860,58; 93,580; 491040; 892800; 31966 $\frac{2}{3}$; 1908000; 110, 88, 05; 4593600; 5587200; 770017400; 11038980000; 72 $\frac{1}{2}$.

Less than one-half of the class got the correct answer to the first example; fifty had the second correct; only eleven secured the desired result in the fourth; and 7—all boys—obtained the mastery in the fifth. Of 39 girls, not one had

the right answer to the fourth or sixth, and only 3 worked the interest problem to a successful conclusion. The girls averaged 9 per cent. on the test.

In Goshen only 5 pupils missed solving the first example correctly. The fifth was solved by all but two—both boys—who gave as their answers 351 and 526½ respectively. These appear rather large numbers to be one-third of 175½. With reference to the interest problem, 8 pupils omitted it altogether, and 7 solved it incorrectly, all the rest of the class having presented a correct solution. The 7 incorrect solutions were: \$25,991.80; \$3,218.00; \$896.80; \$887.80; \$467.90; \$978.00; \$869.80.

Out of a total of 46 who made 100 in arithmetic, 26 were boys and 20 were girls. The whole class of 101 was composed of 54 girls and 47 boys. These comparative results in arithmetic speak for themselves.

Equally interesting are the results in spelling. For instance, on the old papers the words "heiress" and "baptism" were spelled in the following ways:

heirress	airress	areress	baptisim
hurriess	ailess	arerest	baptisimn
heirruss	airest	eiress	baptisem
heirees	airresst		baptisom
heirness	airhess	babtism	baptisum
hieress	arress	baptisism	baptisemn
heress	arris	batism	baptysm
hirress	aries	batisim	baptisiam
hereis	ariest	baptsim	baptiasm

Our own papers show some brilliant flashes of originality, but with some differences. In the old papers we find that 31 pupils out of 85 misspelled "baptism" in 15 different ways. The word "heiress" was written by 43 pupils in 22 different ways. In our own papers we find that 31 pupils out of 101 misspelled "baptism" in 20 different ways, and nine pupils misspelled "heiress" each in his own way. The list follows:

babtizm	baptizam	babtazim	hierest
babtizimn	bathizthm	babtisum	harriss
babtismn	batistion	babtisem	earess
babtisiom	babptisim	babystism	hirress
batisim	baptysm		herris
baptisim	babtism	hirest	airasess
baptisism	baptizem	eiress	heirous
bapitisan			

Notwithstanding the fearful and wonderful ways in which our children managed to misspell "baptism," we have the satisfaction of knowing that, with approximately 4 years less schooling they raised the total percentage of correct answers from 40.6 to 46.2.

When we consider that originally the questions were set for pupils who heard English in all their homes, who attended school one-third longer each year than now, who had fewer studies and hence more time for each, who had been during the five preceding years under able principals, were in a school in which the younger and backward pupils had been taken out nearly two years before, and were of an average age with our present high-school freshmen, the results of the examinations in 1905 present to the thoughtful critic a number of very plain facts. The results establish the superiority of the modern schools in spelling and arithmetic. If the test had been set for pupils in Springfield alone, this conclusion might be questioned, but it would be difficult to prove the incorrectness of it, since the pupils of two representative schools so far apart as Springfield and Goshen show uniformly greater grasp and increased power.

Nor is it difficult to explain the reasons for the superiority of the modern school. In 1846 11 different books, excluding geography, history, and physiology, were read below the high school. Today our children read from 70 to 80 in covering the same course. Our school libraries are filled with books that are not only informational, but have their substance arranged in a manner to stimulate and arouse the interest. These books cover a vast range of subjects, and in their reading the child acquires unconsciously a large vocabulary, an increase of power over the spelling of words, larger opportunities, is broadened, enriched, increased in capacity for enjoyment, and widened in his sphere of usefulness.

There can be little question that the school today is vastly superior in efficiency to the school of our grandfathers' time; and in my own mind there is equally little question as to the fact that in like manner, following the incorporation of the gymnasium, the bath, domestic science, and manual training, will the schools of our grandchildren be superior to our own.